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ABSTRACT

Possible implications of individual and group differences for educational research and practice are discussed. Differences include preference for cooperative versus competitive tasks; for working alone versus in a group; for structured versus unstructured learning situations; or for individual versus group reward contingencies; social class and racial differences; language differences; interactions between motivational structures and responses to reward versus punishment; and sex differences. The assumption that schools should pitch to strengths and attempt to avoid weaknesses is called into question on two grounds. First, this assumption usually includes another, less explicit assumption, that different paths will lead to the same ultimate goal. However, pitching to strengths and avoiding weaknesses usually will increase group differences, not decrease them. Secondly, remediation of weaknesses is also needed if the weaknesses are of societal importance. Thus matching instruction to learner characteristics is seen as requiring value judgments about what is or is not desirable both for the students and for society at large. (Author/MJB)

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The main objective of the CORRELATES OF EFFECTIVE TEACHING PROJECT is to expand the number of teaching principles based on documented findings from systematic classroom research. The problems and processes studied have been selected on the basis of observation and consultation with teachers and school personnel. Emphasis is on the study of the classroom to discover how these processes can be conducted to the greatest advantage of teachers and individual students.

One of the project's major efforts was a two-year study of teaching effectiveness involving the examination of the classroom behavior of teachers consistent in producing student learning gains.

Since 1974 three other major data collection efforts were initiated and completed.

(1) STUDENT ATTRIBUTE STUDY which looked at student characteristics and behaviors and their effects on teachers.

(2) FIRST GRADE READING GROUP STUDY, an experimental study designed to test the effectiveness of selected group management techniques in teaching reading.

(3) JUNIOR HIGH SCHOOL STUDY, a follow up on earlier work from the second and third grades of the influence of teacher characteristics and behavior on students' cognitive and affective gains.

Interactions between Learner Characteristics and Optimal Instruction

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Report No. 75-17

This paper is an expansion of a paper of the same title delivered by Dr. Brophy as part of a symposium entitled "The Contributions of Social Psychology to Education," at the annual meeting of the American Psychological Association, Chicago, Illinois, 1975.

This is a prepublication chapter of a book tentatively titled The social psychology of education: Theory and research (Daniel Bar-Tal and Leonard Saxe, editors; Hemisphere Publishing Corporation, in press).

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My personal and professional interests center primarily on individuals rather than groups, so my major interests related to the interface between social psychology and education center on questions about how psychological data can be used to individualize instruction to maximize outcomes for all. I am interested in group dynamics and group leadership, but these topics are covered by leaders in the field in other chapters of this volume. Consequently, I will concentrate on another area of interface between social psychology and education which is of special interest to me: group and individual differences.

In focusing on group and individual differences that appear to have implications for education, I make no attempt to differentiate sharply between social psychology and related areas, such as personality psychology or the psychology of individual differences. I believe that these fields merge into one another and are mutually supportive. Social psychologists will note that only some of the learner characteristics that I will discuss represent research traditions that clearly fit within social psychology as commonly defined. Others involve social and personal traits not always addressed by social psychology as such, although all are products of socialization. However, because the primary goal of this paper is to call attention to learner characteristics which may have important implications for optimizing instruction, I will concentrate on this effort, making no systematic attempt to classify characteristics according to whether they are representative of social psychology.

Observed Group Differences as Relevant Learner Characteristics

Social psychologists and other researchers have identified numerous sex and race differences, and also differences between identifiable groups such as ethnic groups or social class groups. It should be stated at the outset that these group differences are relative rather than absolute, and that variance within groups almost always is much greater than variance between groups. Thus, although group membership is a useful indicant, ultimately the unique characteristics of individuals must be used as criteria for making decisions about how they should be treated.

In addition to observed differences among groups, numerous individual differences that develop over time are relevant to the school experience. It is possible to form groups of individuals who are similar on one or more of these characteristics for purposes of prescriptive instruction. For example, it is possible to separate introverts from extroverts or students oriented towards competition from students oriented towards cooperation. It also is possible to deliberately mix these types of students in order to form heterogeneous groups with respect to these learner characteristics.

Matching Instruction to Learner Characteristics

The existence of such learner characteristics naturally leads to questions about how knowledge about them might be used to improve the school experiences of some or even all students. Presumably, by individualizing instruction or by grouping students according to relevant learner characteristics, teachers

can arrange for different students to be taught differently. Ideally, all students would be taught with the approaches that were most likely to succeed with them.

The basic idea is hardly new. It is at least implied in such familiar phrases as individualization, prescriptive teaching, diagnostic teaching, and "teaching the whole child." Furthermore, the concept of aptitude by treatment interaction was discussed in detail by Cronbach (1957), and interest in this topic has continued ever since. "Aptitude by treatment interaction" refers to the possibility of interactional (differential) relationships between different treatments (in this case, different instructional approaches) and learner aptitudes. That is, an interaction between treatment and aptitude would exist when one method worked better with brighter students, while another method worked better with duller students.

Unfortunately, the term "aptitude by treatment interaction" is a little too narrow, because it focuses on learner aptitude alone. As Cronbach (1975) himself notes in an important recent review, numerous cultural, motivational, personal preference, and personality characteristics also are known or suspected to interact with instructional variables to determine student outcomes. Consequently, I prefer the broader term "learner characteristics." This includes any group or individual difference that might be relevant for differential educational practice.

The literature on aptitude by treatment interaction has been disappointing. Bracht (1970) conducted an extensive survey of it, and found that the percentage of studies reporting a significant aptitude by treatment interaction was only about what would be expected by chance. Further-

more, the studies that did show significant interactions usually involved personality variables rather than aptitude variables. Studies completed since Bracht's review have been more promising (Cronbach, 1975), although no one has succeeded yet in identifying interactions powerful enough to motivate educators to incorporate them systematically. Thus, at the moment, the logic of an interactional approach to instructional planning, is theoretically sound, but the approach has not been employed in practice successfully yet.

However, many of the studies which failed to find predicted interactions used weak treatments which were unlikely to have much effect in the first place. Many others used extremely artificial treatments unlikely to generalize to typical classrooms. In fact, most of them involved individual study of programmed material, so it can be questioned whether there was any real basis for expecting their results to generalize to classroom instruction. Thus, perhaps researchers looking for interactions have not been looking in the right places.

Furthermore, Hunt (1975) recently has argued that operationally defining such interactions as a significant interaction in an analysis of variance is artificial and overly strict, tending to mask interactions that might reveal themselves if methods he considers more appropriate were used. He also calls for more attention to whether or not the hypothesized relationships among variables fit individual cases. He makes this point with a thought provoking example of a "general law" which was inferred on the basis of group data, but which did not apply to a single individual in the group!

Hunt also goes beyond the traditional treatment of this topic by suggesting some needed new emphases. In particular, he calls for more attention to the need to orchestrate instructional approaches within a developmental plan intended to move learners along systematically from where they are now towards higher goals (as opposed to simply responding to learners as they are, without making any attempt to change them). He also stresses the need for optimizing or matching instructional activities to the specific needs of learners (which may change over time). His analysis also contains several other useful and thought provoking ideas, and I recommend it to readers interested in pursuing the topic.

Similarly, Good and Power (in press) have developed a sophisticated and detailed model for optimizing instruction to match learner characteristics as well as learning tasks and learning environments. Here again, the emphasis is on optimizing education by matching instructional strategies to the specifics of situations, rather than simplistically attempting to identify and apply isolated aptitude by treatment interactions.

Other than occasional exceptions like these, however, the literature on aptitude by treatment interactions has not been very encouraging to date. In addition to questionable treatments, concern about defining what constitutes an interaction, and the relative neglect of personality and social variables, the search for aptitude by treatment interactions, as it has been carried on so far, at least, has established certain conventions that appear questionable at best.

First, there is a tendency to assume that instruction should be arranged so as to accommodate the learners' preferences or strengths and

avoid their dislikes or weaknesses. The idea here is that learning will proceed best when it is enjoyable and easy, so that it should be made as enjoyable and easy as possible. However, often implicit beneath all this is the additional idea that individuals taught with different methods ultimately will arrive at the same place. This obviously is not true as a general rule. In fact, I suspect that it is the rare exception.

Both logic data suggest that if preexisting differences are reinforced, these differences will increase. Thus, it may well be true that short term learning can be improved by presenting material visually to learners who are visually oriented and orally to learners who are verbally oriented. However, this does not mean that either group necessarily will be better off in the long run if taught this way all the time. In fact, there is reason to believe that both groups will be less well off in the long run.

A second assumption, which sometimes appears with and sometimes instead of the first, is simply that it is better to pitch to strengths and avoid weaknesses than to do the opposite. Again, while this may be true in the short run, it usually is not true in the long run. In particular, it is not true where weakness areas have societal importance. That is, if individuals must develop their weakness areas up to at least minimal levels in order to cope successfully with societal demands, their long run interests are served best by concentrating on these weakness areas, even though they may find this less enjoyable and more difficult in the short run.

Examples are easy to identify. Individuals who speak no English will learn most easily if taught in the language they already speak. However, if they must function in an English speaking society, they will be at a

severe handicap, no matter how much else they may have learned, if they do not become proficient in English.

To take a less obvious example, consider individuals who are weak in verbal aptitudes but strong in mechanical and spatial aptitudes. This pattern probably will show itself in their school achievement and occupational and avocational interests. If they are high achievers, such individuals probably should go into physical science or engineering rather than law or the humanities. People with similar patterns but less general ability and/or opportunity should go into auto mechanics or applicance repair rather than sales or other jobs that require reliance on verbal skills. However, verbal skills are so important for everyday functioning in society, regardless of one's occupation, that they must be mastered to at least some minimal level by everyone (for example, functional literacy in reading and writing skills, and sufficient development of verbal expression skills to enable the person to communicate effectively).

In summary, most writers who have concerned themselves with interactions between learner characteristics and optimal instruction have counseled pitching to strengths and avoiding weaknesses, on the assumption that this would bring everyone to the same place but with more enjoyment and less difficulty (for exceptions, see Hunt, 1975, and Good and Power, in press). However, analyses of these assumptions reveal that pitching to strengths and avoiding weaknesses is more likely to increase individual differences and take people to different end points. Furthermore, if weaknesses are in areas of great societal importance, it is essential that individuals attain at least minimal levels of competence, even though this may be unpleasant and/or difficult for them.

It should be noted that this is no easy task. Shoring up weaknesses often is a difficult and painful process at best, and if it is botched, it can backfire and make things considerably worse. However, it often is advisable or even essential.

Learner Characteristics and Differential Practices

Bearing in mind these cautions, let us consider some learner characteristics which may have implications for differential educational treatment of different students. In each case, the existence of the group or individual difference implies that learning might be optimized for all if it were matched to the specific needs of each student. However, we need to consider the question of what constitutes an ideal match. As we will see, this is difficult to determine for most of the characteristics discussed.

Cooperation vs. Competition

Studies of motivational structures have revealed that some individuals are competitive and prefer competitive situations, while others tend to be cooperative and to prefer cooperative situations. This difference tends to be related to achievement motivation, although there is no necessary relationship between competitiveness and achievement motivation if achievement motivation is defined as an orientation towards competing with internal standards of excellence (vs. competing with other individuals) For a good review of this research and a discussion of its educational implications, see Johnson and Johnson (1974).

In addition to these studies of individual differences, Kagan and Madsen (1972) and their associates have conducted a series of studies which reveal a rather clear cut difference between Mexican and American students on this dimension. Mexican children spontaneously form cooperative groups and work together in problem solving situations, while American children (both black and white and both middle class and lower class) tend to compete as individuals. In both cultural groups, these tendencies are strikingly strong, at least among boys, sometimes to the point where they become self-defeating (i.e., Mexicans sometimes are cooperative when it is in their best interests to be competitive, and Americans sometimes are competitive when it is in their best interests to be cooperative). Other researchers have found other cultural differences of a similar nature (Miller and Thomas, 1972). Within American culture, there also are racial and rural-urban differences of a similar nature (Johnson and Johnson, 1974).

These data imply that American boys will be motivated positively by opportunities to compete as individuals for some kind of prize or recognition, and that they will respond neutrally or even negatively to attempts to get them to cooperate. Conversely, it appears that Mexican boys respond very well to opportunities to work together in group problem solving situations featuring cooperation, but would respond negatively to attempts to get them to compete as individuals. Thus, pitching to strengths (preferences, in this case) probably would maximize motivation for each group, at least in the short run.

However, note that Mexican boys' preferences for cooperation and American boys' preferences for competition are so strong as to be inappropriate and self-defeating in certain situations. Thus, one could argue

that, if anything, Mexican boys need to be socialized to become more competitive, at least where competition is adaptive, and that American boys need to learn to become more cooperative, at least where cooperation is adaptive. If one accepts the proposition that the school has a socialization function as well as a purely educational one, it follows that, in this case, optimizing the educational experiences of all students involves shoring up weaknesses rather than pitching to strengths.

Learning in Individual vs. Group Settings

A related individual and cultural difference is a preference for learning individually vs. as part of a group. Here, Mexican boys appear to prefer group settings and American boys to prefer individual settings. Individuals within each culture differ even more in such preferences (Sutter, 1967). Here again, the implication for education seems to be that socialization towards an appreciation of (or at least an ability to exhibit when necessary) the non-preferred mode of learning is needed.

Individual vs. Group Reward Contingencies

Studies involving applications of behavior modification procedures to schooling have shown that some students show a definite preference for individual rewards, while others show a definite preference for group rewards. Among other things, the highest achievers tend to prefer individual rewards and the lowest achievers to prefer group rewards. Similarly, "over-achievers" tend to prefer individual rewards, while "under-achievers" tend to prefer group rewards (Hartup, 1970).

In this case, I see no simple solution. Pitching to strengths will only increase group differences, and perhaps create elitist attitudes in students who prefer individual rewards and alienation in students who prefer group rewards. On the other hand, constant exposure to the non-preferred reward contingencies is likely to irritate and discourage high achievers who feel that they are pulling more than their weight (usually correctly), and it might also cause squabbles among students. For example, the harder workers might blame and reject the students who did not work as hard if the group failed to get rewarded or did not get rewards that it could have gotten if it performed better.

All things considered, I would recommend a combination approach, offering each type of reward contingency at different times. Also, group reward contingencies could be made more attractive to some students by adding bonuses for those who worked the hardest and thus were most responsible for the success of the group as a whole. This would retain some of the incentive for the harder workers to continue to work hard, but at the same time it would provide some incentive for them to help rather than blame their fellow group members.

Meanwhile, those who did not work as hard probably would prefer this arrangement to continuous individual competition. They would get help from fellow students in the group, which would improve their own performances, but the group performance still usually would be higher than their own, so that they would get more rewards than if they worked alone. At the same time, there would be some group pressure on them to work harder and pull their own weight. This proposed solution involves going part way to satisfy both groups,

but it retains elements of the non-preferred incentive system in order to apply some pressure on both types of students to change in desirable directions (note, however, that it assumes that rewards are scaled to ability levels and thus contingent upon effort, not absolute performance).

Introversion-Extroversion

Introverts tend not to volunteer information or call out answers during class discussions, and when called upon by teachers they often are shy or brusque in responding. In any case, they do not enjoy responding in public situations of this kind, and they usually will not do so on their own initiative. In contrast, extroverts usually are more than happy to answer, often call out responses frequently and have to be reminded to keep quiet and respect other students' turns, and tend to give chatty and detailed responses. If teachers only call on students who raise their hands, the introverts will not respond often. Conversely, if teachers want to equalize individual participation in group discussions, they will have to go out of their way to ignore or even stifle extroverts and call upon introverts to participate involuntarily (Brophy and Good, 1974).

Here again, it is not possible to draw simple implications for optimal learning. If teachers follow the students' preferences, introverts rarely will participate in public discussions. This strikes most observers as intuitively wrong, partly because it seems "unfair" to allow extroverts to dominate the conversation, and partly because of the fear that continued deference to the preferences of introverts will reinforce these preferences and ultimately harm both their achievement and their social adjustment. These arguments are not compelling, but they do have face validity for many.

However, the idea that teachers should attempt to equalize participation in classroom discussions has many problems connected with it. First, continually stifling the extroverts is likely to irritate them and diminish their motivation, and possibly also to cut short potentially creative and important contributions. Also, an experiment involving deliberately calling on students who did not volunteer to participate in classroom discussions indicated that this tactic backfired (Schultz and Dangel, 1972).

Here again, neither extreme is satisfactory. I think I would advise teachers to partially accommodate student ferences by allowing extroverts to participate more often than introverts and by avoiding forcing introverts to participate when they clearly do not want to. At the same time, however, I would advise making an effort to socialize extroverts to raise their hands and get recognized before speaking out, and, more generally, to respect their classmates' "rights to the floor." Conversely, I also would suggest that teachers try to gradually condition introverts to respond more frequently, but to do so in non-threatening ways.

Among other things, this would mean avoiding "putting the student on the spot," and being careful to see that their systematic behavior was not recognized as such by the students (so that introverts would not feel resentment at being "manipulated" or embarrassment at being singled out for special treatment by the teacher). Another possibility is more small group interactions for introverts. The combination of a smaller, more intimate group setting and the absence of the more extreme extroverts would make it easier for introverts to participate without undue anxiety.

Language Differences

The point was made earlier that students who do not speak English need to learn to express themselves adequately in English if they are to cope successfully with American society. Few would argue with this, although many have argued about how schools should treat students who speak English but with racial or geographical dialects. This is one area where advocacy for pitching to strengths (Labov, 1972; Baratz and Baratz, 1970) has been recognized as inappropriate and criticized, so much so that the idea now is dying out (Hall, et al., 1973; Copple and Suci, 1974).

However, just a few years ago, many individuals, particularly linguists and psycholinguists, were arguing that children who spoke "black dialect" or other presumed dialects with or without specific names should be taught in the dialects with which they were familiar, either throughout their schooling, or at least for the first several years. Subsequent critical arguments and empirical investigations have established that this approach would be a mistake, compounding rather than easing the problems of the people meant to benefit by it.

There now is general agreement that teachers should not reject or punish students for spontaneous use of language spoken in their home, neighborhood, or cultural group. However, there also is agreement that teachers should provide good language models for their students, and that there is no evidence to support the systematic use of dialects during instruction. For monolingual English speakers at least, the whole topic is rapidly disappearing as an issue, as it becomes evident that everyone has a dialect, whether or not it is labeled.

The situation is somewhat different with individuals for whom English is a second language, most notably Spanish speakers originally from Latin America. While there now is agreement that these individuals need to learn English, it still is argued that they can progress in school most satisfactorily if taught initially in Spanish (if that is their dominant language) and then phased into English after basic concepts have been taught in the native tongue (Nedler, 1972). This remains a viable possibility, because presently available data are both sparse and inconclusive. However, this area is one presently promising possibility for a truly practical interaction between learner characteristics and instruction, and it is one of the relatively few that would involve pitching to strengths, at least for a time.

Social Group Differences

Social psychology has revealed a large number and variety of differences between various groups (racial, ethnic, cultural, social class, etc.). These provide potential bases upon which to develop educational experiences planned specifically for particular groups. So far, the most progress probably has been made in the development of special curricula and materials for black students. Based on findings that individuals tend to identify most easily with models similar to themselves, efforts have been made to include black individuals in stories and pictures in school books, to include previously ignored blacks in history books, and, at higher levels, to develop black studies programs.

However, other attempts in this area have not fared so well. Rejection of the idea of teaching in black dialect has been mentioned already. Also, although it has been important to introduce black teachers into schools serving black children where none existed previously, most blacks reject the idea of an entirely black faculty or student body. They believe that whatever gains such segregation might bring are less impresssive than those associated with integrated education (other things being equal, of course, which they seldom are).

The outcomes of efforts to build educational programs targeted specifically for blacks probably is representative of similar efforts aimed at other groups. After much trial and error, the ultimate resolution usually involves agreement that the minority group should not be punished for culturally approved behavior and that minority group models and historical figures should be included in the curriculum, but that otherwise, the schools should concentrate on teaching the same things that are taught to everyone else.

In short, the resolution usually involves essentially negative prescriptions (do not punish culturally sanctioned behavior). Positive prescriptions usually are limited to the inclusion of appropriate models and historical figures in the curriculum and to accommodation to group preferences in foods, sports, music, and other school activities outside of the basic curriculum. However, attempts to go beyond this by substituting culturally specific instruction for the "standard" curriculum usually are resisted.

An additional problem that often complicates attempts to change schools to accommodate to the needs of minority groups is a tendency to confuse the behavior of minority group members with their culture. Sometimes behavior and culture are equated, a serious mistake, in my opinion. Many individuals show certain behaviors habitually because they are accustomed to them or because they never have been exposed to anything else, but not because they are part of a "culture" which is positively valued or even consciously considered. This happens especially regularly with social class differences.

For example, it is true that lower class parents use much more physical punishment in disciplining their children than middle class parents do (on the average), but it would be incorrect to call this behavior "cultural" or to imply that it is done because the parents have considered the matter carefully and decided that this is the best way to raise children. Quite the contrary. Research with lower class parents consistently indicates that they realize that physical punishment is futile in the long run, but that they resort to it for lack of knowledge of what else to do (Hess, 1970). Furthermore, few such parents want the school to employ physical punishment as a "standard" method of dealing with student problems.

In most cases, lower class individuals with limited education know what they want for their children (basically the same things that everyone else wants), although they usually do not know how to get them. They usually view the school as an instrument for upward mobility, so they want

their children to get a good grounding in the basic tool skills of reading, writing, and arithmetic. They want schools to teach their children what they need to know in order to succeed in our society, not to reinforce what they know already.

However, there is some evidence that differential treatment of children from different social classes can be beneficial to both, if handled properly (Brophy and Evertson, 1975). In general, lower class children tend to learn more if taught somewhat less but if taught more redundantly (smaller chunks, more individualized and frequent opportunities to practice and get feedback). They also tend to do better if taught with patience and friendly encouragement.

In contrast, children from higher SES homes respond better when challenged with more difficult material and taught at a brisker pace. They can learn more in the same amount of time, and they respond positively to challenging and difficult (although interesting) assignments. Furthermore, they seem not to need patience, encouragement, and warmth to the degree that lower class children do. Sometimes, in fact, they respond better to critical demandingness than to patient encouragement. Findings like these have rather obvious implications for differential treatment which would maximize the achievement of children from different social class backgrounds, although it should be noted that they refer only to achievement and might need to be modified if other goals were taken into account (such as student attitudes toward school).

In any case, as far as they go, the data concerning lower class children indicate that optimal teaching is achieved by counteracting rather than reinforcing the motivational strategies to which they are accustomed. Teachers who are most successful with them are warm, patient, and encouraging, rather than threatening and punishing. With high SES students, in contrast, the optimal teacher treatment is better matched to the socialization methods used by most of their parents.

Victims of Discrimination

These considerations concerning race and social class also apply to some of the data on the differential instruction needs of members of minority groups who are victims of prejudice and discrimination by dominant majorities. Although much research is available to document the existence of discrimination and of the many difficulties that such groups encounter at school, few data are available to indicate what can be done about these problems. The data that do exist suggest something similar to the ideas just discussed.

For example, St. John (1971) studied 36 teachers considered to be exceptionally successful in teaching black children. She concluded that, as with the lower class children studied by Brophy and Evertson (1975), the teachers who were most successful with these children were the ones who were the warmest and most patient and understanding. In general, liking the teacher and feeling that the teacher liked them was more important to the learning of black children than was the belief that the teacher was especially skilled, well organized, or otherwise effective in purely instructional matters. The reverse was true for white children.

Kleinfeld (1975) reported similar data in her studies of Alaskan schools. She found that Indian and Eskimo children experienced both culture shock and hostility and discrimination when they made the transition from their culturally homogeneous village schools to city schools. Anglo students who lived in the cities dominated these schools, and the Indian and Eskimo children who were bused in suffered discrimination and related problems similar to those suffered by low income blacks bused into predominantly middle class Anglo schools.

Kleinfeld identified two types of teachers who were ineffective with these minority students, and one type that was notably effective. Some of the ineffective teachers were prejudiced and discriminatory themselves, harboring negative attitudes and low expectations. Consequently, they accomplished very little with the minority students.

Other ineffectual teachers had very positive affective responses towards these students. They felt very sorry for them and tried to do everything they could to make them feel comfortable and to try to help "atone" for the indignities that they were suffering at the hands of the Anglo majority. However, at the same time, they harbored low expectations concerning the students' learning potential. As a result, they tried to meet the students' affective needs (as they perceived them), but they did not try to teach them much. They did not think that the students were capable of learning much, and they did not want to "put them on the spot" or cause them to be embarrassed.

The teachers who were effective with these minority students were those who harbored positive attitudes towards the students and did what they could to personalize instruction and make the students feel comfortable in their classrooms, but who also made every effort to teach these students as much as they possibly could and to hold them responsible for completing assignments. Like the effective teachers of lower class children in the Brophy and Evertson (1975) study, these effective teachers combined high expectations and a determination to teach with personalized instruction and a willingness to meet students' affective needs.

Data like these seem to indicate that children who are alienated from school or learning experiences need a different kind of instruction than children who are highly motivated and generally successful. However, this statement must be taken in a developmental context. That is, the long range goal is to move learners as far as they can progress, not merely as far as they can progress if treated as alienated learners with speical needs. Thus, to the extent that teachers are effective in meeting special needs, such learners should become more and more like majority group students. As this occurs, their needs will change, so that they will benefit the most, at least cognitively, by being taught in ways similar to the ways that the dominant group is taught.

Achievement Motivation

Individuals high in achievement motivation, especially if they also are high in actual achievement, tend to respond better to criticism than to praise. Conversely, individuals low in achievement motivation, especially if they also are low in actual achievement, tend to respond better to praise than to criticism (Van de Riet, 1964). This probably is part of the explanation for the social class difference mentioned above, although other factors no doubt are involved too. In any case, the implications for individuals with different motivational structures seem straightforward, and in a sense they are. However, the implications for those high in achievement motivation must be heavily qualified.

First, criticism appears to be appropriate and to function as a motivator only when students have done poorly for lack of effort or other failures to apply themselves. No child who has been trying his or her best should be criticized. Also, although there are no definitive data on the matter, it seems intuitively logical to hypothesize that the relationship between criticism and performance is curvilinear rather than linearly positive. If it were ethical to do so (and I do not think it is), it seems likely that exposing students high in achievement motivation to a constant diet of criticism every time they made a mistake would impair their learning compared to that of similar students given a more reasonable balance of praise and criticism.

To put this another way, in the present case it appears that the "findings" from social psychology are oversimplified and overgeneralized.

Experimental work usually involved mild and brief criticism given by strange experimenters in one-shot studies. This is very different from constant criticism over the course of a school year from a familiar teacher. Before the true implications for education can be set forth, specification of effective vs. ineffective types of criticism, situations where criticism should or should not be given, and statements about the probable optimal rate of criticism (and probably also of the optimal rate for praise) will be needed.

Need for Structure

Individuals differing in conceptual level respond differentially to highly structured vs. unstructured educational experiences (Hunt, 1975). Those high in conceptual level prefer and usually to do better in less structured classrooms which place a premium on individual initiative and independent learning through discovery and exploration. Conversely, individuals lower in conceptual level both prefer and do better in classrooms featuring tight structure by the teacher, clear cut assignments which maximize specific demands and minimize student choice, objective tests rather than essay tests, and the like.

Others working from different perspectives (authoritarian personality, dogmatism, cognitive style, independence-dependence, anxiety, etc.) also have found similar differences between individuals who prefer structured situations in which authority figures spell out very clearly what will be expected of them vs. individuals who prefer unstructured situations where

they were given a maximal opportunity to choose and manage their own learning experiences (Domino, 1971; Dowaliby and Schumer, 1973).

Students who differ in locus of control (Arlin, 1975) also differ in need for structure. Locus of control refers to people's beliefs about the degree to which they and their environments are subject to their own control versus being out of personal control and dependent upon such factors as God's will, fate, chance, or luck. Individuals who believe that they can control what happens to them tend to take action to try to do so, and to take personal responsibility for outcomes, good or bad. In contrast, the person with an external locus of control tends to feel powerless in the face of strong and unpredictable forces. Instead of taking control, such individuals feel that their roles are limited to finding out what forces are operating and attempting to respond to them. They also tend to feel less responsible for their own actions and their outcomes, because they feel less in control of the situations they face.

Given these qualities, it is not surprising that people with an internal locus of control tend to prefer more open situations in which they have freedom of choice about what to do and how to do it, while people with an external locus of control tend to prefer (perhaps the better term would be "to feel safer in") highly structured situations in which they know exactly what to expect. They are willing to give up the freedom associated with more open sitautions in exchange for the security that comes with highly structured situations.

Here again, if we were to apply these data in the seemingly obvious fashion, we would determine student preferences for structure and teach those who prefer sturcture in a structured way and those who did not in an unstructured way, thus maximizing the achievement and the attitudes of both groups. To a degree, this seems defensible, perhaps even optimal. If individuals both learn more and enjoy it more when taught one way rather than the other, why not teach them the way that works best for them?

My only reservation here concerns the possibility that some individuals may be extreme in their preferences on this dimension, so that reinforcing them systematically night ultimately create problems. For example, individuals who strongly prefer structure also tend to score in socially undesirable directions on several personality and conceptual style and level measures, and there is good reason to believe that they would have difficulty in situations requiring independent thought and action. Such individuals might manage to avoid such situations where possible, but they are not likely to escape them altogether. Thus, they will need at least a minimal amount of practice (and hopefully success) at dealing with situations that require independence in coping with unstructured situations.

Conversely, although independence is generally valued and valuable, certain individuals will get into trouble with society if they become so independent that they ignore environmental constraints and the rights and privileges of others. Also, while their preferences for freedom from structure certainly are understandable, many situations inherently involve structure, and everyone has to learn to cope with them effectively, regardless of their preferences.

Taking these considerations into account, then, I would give a qualified endorsement to the idea of responding differentially to students' needs for structure. However, I think that this should be done on an informal level and not carried to the extreme of testing everybody for placement into different classes or streams. Also, this dimension is another one which seems to have implications for occupational counseling and guidance. Unless there is some evidence of a desire to change and some progress in making changes, individuals who prefer structure might be guided towards occupations that involve structure, and individuals who resent structure might be guided towards occupations that place a premium upon independence and creativity.

Sex Differences

I am going to consider only one more group difference: sex differences. I have saved this one for last because it affects everyone and probably is the most elusive, confusing, and perhaps controversial of the learner characteristics seriously being considered for its implications for differential schooling at the moment. I believe that the resolution of this particular problem involves value judgments rather than value-free facts almost completely, so that I make no attempt to develop an integrated set of conclusions. However, I do wish to point out some of the complexities that are involved.

First, although a long list of sex differences has been documented repeatedly, it appears that almost all of the differences relevant to education are determined culturally rather than biologically (Brophy and

Good, 1974). Given this, along with the present upheaval in female consciousness of role definitions and in sex roles generally, there is reason to believe that many of these sex differences will disappear in the near future. Thus, any proposal for differential treatment of males and females based upon existing sex differences is tenuous at best. For example, very few females these days would go along with the idea of excluding girls from mathematics or science classes on the grounds that girls tend to have more difficulty with these subjects than boys do.

A related difficulty with attempting to apply knowledge about sex differences to education is the problem of values mentioned previously. Presently, there is much disagreement among people of all walks of life concerning what are, or should be, idealized male and female sex roles. Consequently, any teachers who deliberately designed educational experiences with certain idealized sex roles in mind necessarily would be foisting values upon their students, and, indirectly, upon their families and the community at large. If these values conflicted sharply with those of the community, there undoubtedly would be trouble.

Even where difficulties are minor enough to allow the systematic incorporation of sex role ideals into the design of education, the problems of values and individual rights remain. Boys who take up activities identified with girls, and girls who take up activities identified with boys, probably will suffer a degree of teasing, at the very least, for being statistically abnormal (and, in the minds of some, for being psychologically abnormal). This is fine, if the students are prepared for it, but teachers should check this before attempting to channel students

into cross-sex activities. Even in a school where cross-sex activities and the general concept of androgeny are accepted, the matter of individual rights still remains. What if a girl wants to grow up to be a "pink lady?" What if a boy wants to be a male chauvinist pig?

These questions are not raised purely in jest, for they get to the heart of the issues raised in this paper. Not everyone can identify with the various characteristics reviewed previously, but everyone has ideas about sex roles and about what should or should not be done about them in the schools. The complexities associated with these topics, and the emotions experienced in the process of thinking about them, are representative of those experienced by individuals who fit in the other categories discussed previously. Thus, it will help bring the issues home if you consider for a moment the implications of taking either extreme approach to implementing educational programs based on observed sex differences.

If we want to build upon existing differences, we should segregate the sexes and have male students taught by male teachers and female students taught by female teachers. A few writers advocate this, and not without supporting arguments and data. In particular, some feminists have argued that females are better off in all-female colleges, and comparisons of graduates of such colleges with graduates of coeducational colleges usually support the idea, at least to some extent.

However, if we were to be thorough, we would go beyond mere segregation of the sexes and systematically socialize boys to become more ag-

gresive, competitive, independent, and spatially and mechanically oriented than they already are, and girls to become more affiliative, dependent, deferent, and verbally oriented than they already are. This strikes most people as inherently stupid, but conceptually it is identical to most proposed adaptations of educational experiences to existing learner differences.

The opposite alternative would be a systematic attempt to obliterate all sex differences and produce androgenous persons with identical sex roles (or to be more exact, with no sex roles). This strikes many as the ultimate solution. Even if it is accepted in theory, however, realism requires that it be approached slowly and carefully. Attempts to make dramatic and radical breaks with traditional practice would create havoc and almost certainly backfire, and we should not lose sight of the fact that this goal is a value judgment. Numerous unforeseen difficulties can be expected if traditional sex roles gradually disappear, and there always remains the possibility that some irreducible minimum of sex role differentiation may be necessary.

Developmental Considerations

Most of the theorizing concerning optimizing instruction to match learner characteristics has come from writers and researchers concerned primarily with post-secondary education, and most of the successful implementations of these ideas are in college and university settings. Reflection on the issues raised previously suggests that this may not

be accidental. If the problem is viewed from the perspective of developmental psychology, it seems reasonable to conclude that the feasibility of individualizing instruction varies with the developmental levels of the students involved.

Most of the cautions expressed about misapplication of individualization notions by pitching to strengths prematurely when an individual's long run best interests might be served better by shoring up weaknesses imply that the individual still is in "the formative years." However, individuals legally are adults by the time they reach college, and it can be argued that schools no longer have socialization responsibilities once their students have passed "the formative years" and attained status as adults who are responsible for themselves and free to decide what they want. Most observers probably would agree that this is the case with respect to colleges, and many would extend this down at least to the high school level.

In any case, once there is agreement that the school no longer should attempt to remediate weaknesses or socialize students in particular ways, but instead should deal with them as independent adults and attempt to respond to their expressed needs and preferences, pitching to strengths begins to make sense. This is partly because adults <u>are</u> responsible for their own choices and actions, even those that are ill-advised. Furthermore, as adult status (however defined) becomes more and more clear, it is increasingly up to students to define and pursue their own goals. Correspondingly, it is increasingly encumbent upon schools to attempt to assist them in this process. Schools always will be responsible, of

course, for maintaining standards of performance, requirements for degrees, and so on, but students who attain adult status should take the initiative in deciding what they want to study, where they want to study it, and, perhaps to some degree at least, how they want to study it.

Thus, certainly at the college level, it makes sense to me to allow students to choose a traditional versus a self-paced course in a subject area of interest, or to choose courses on the basis of interest and aptitude and instructors on the basis of what is known about their competence and methods. If some students prefer certain instructors because they allow much choice of assignments and independent student work, and other students prefer other instructors because they have very clear and explicit course requirements and a generally tightly organized approach to teaching and grading, why not let the students have the courses and instructors they prefer? This approach certainly will maximize student attitudes, and it probably will improve student achievement, so there is every reason to favor it, pending evidence to the contrary.

Similarly, although I favor retaining the idea of a required set of core courses to insure that individuals graduating with particular degrees will have at least sampled a reasonably broad range of content, I can see many advantages and few disadvantages to encouraging students to allocate their optional coursework however they choose. All things considered, I suspect that students intensely interested in relatively narrow subject matter will get more out of intensive work in that subject than they would get out of being forced to take more courses in other areas. Conversely, students who have not yet defined their interests so narrowly or precisely

probably are better off if they continue to sample different areas while trying to "find themselves."

Thus, taking into account these developmental considerations, I would place at least one limitation on the generalized cautions outlined previously. This is the idea that, once students have attained adult status to the point where schools no longer can or should attempt to socialize them and instead should attempt to meet their expressed needs, schools legitimately can abandon attempts to remediate weakness areas and can concentrate on pitching to strengths.

Conclusion

Individual and group differences in social and personal traits have potential implications for optimizing education to meet each student's unique needs, but the problem is very complex. Usually, neither pitching to strengths nor trying to shore up weaknesses will succeed, because such oversimplified approaches cause more problems than they solve.

Furthermore, we lack agreement about the ideal person and about the functions of schools. Thus, we also lack agreement about the ideal student and about the ideal student role. Until and unless such agreement can be reached, prescriptive advice can be given only for those aspects upon which there is agreement. Other advice will be value advocacy rather than applied scientific psychology.

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